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10/616,750	07/10/2003	James L. Lewis JR.	2041219-0005	2336

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EXAMINER

LIN, ING HOUR

ART UNIT PAPER NUMBER

1725

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/616,750

Applicant(s)

LEWIS ET AL.

Examiner

Ing-Hour Lin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-3, 10-11, ~~35~~36 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952.

JP '972 (see abstract) teaches the claimed casting removing method (mold treating processes), comprising: sand molding a mold 4 in a flask 3, moving the mold to a metal pouring station 5 and pouring molten metal in the cavity of the mold 4, scoring the upper mold 4a as crushing-initiation points (lines) and crushing holes in the pre-crushing process 6 and then removing the flask and knocking out the cast product 17 from the broken sand mold in the crushing process 12.

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JP '972 fails to teach the use of directing an energized stream at the mold. However, JP '952 (see abstract and Figs. 1-4) teaches the use of directing an energized stream at the mold 2 such as a jetted high pressure water through the use of nozzle 9 and dislodging at least a portion of the degraded mold (see Figs. 1-4) for the purpose of weakening the mold and promoting the removal of casting 1 from the mold 2. It would have been obvious to one having ordinary skill in the art to provide JP '792 the use of directing an energized stream at the mold as taught by JP '952 in order to reduce cycling time of removing casting from the sand mold.

4. Claims 4-7 and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Pennock et al.

JP 55077972 in view of JP 09182952 fails to teach the use of thermally heating the casting.

However, Pennock et al (col. 2, lines 68+) teach the use of thermally heating the casting (coating 25) with heating means including electrical induction heating means (col. 4, lines 73+) for the purpose of promoting uniform casting and differential expansion between the casting and mold and weakening the mold and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 the use of thermally heating the casting as taught by Pennock et al in order to reduce cycling time of removing casting from the sand mold.

5. Claims 8 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Andrews.

JP 55077972 in view of JP 09182952 fails to teach the use of a degradable binder and sand.

However, Andrews (col. 3, lines 60+) teaches the use of a degradable binder and sand treated with oxidant impregnating liquid for the purpose of promoting collapsibility characteristics of foundry core and mold and weakening the mold after casting and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 the use of a degradable binder and sand as taught by Andrew in order to reduce cycling time of removing casting from the sand mold.

6. Claims 9 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 in view of Schlegel et al.

JP 55077972 in view of JP 09182952 fails to teach the use of heat treating the casting after the mold and core are removal.

However, Schlegel et al (col. 3, lines 30+) teach the use of heat for treating the casting after the mold and core removal for the purpose of promoting mechanic property such as casting hardness (col. 7, lines 38+). It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 the use of heat-treating the casting after the mold and core removal as taught by Schlegel et al in order to improve mechanic property such as casting hardness.

7. Claims 12-13, 14-15, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al.

JP 55077972 in view of JP 09182952 fails to teach the use of explosive charge in the energized stream. However, Vinton et al (col. 3, lines 27+ and EXAMPLES 2 and 6) teach the use of explosive charge (oxygen gas mixture) in a casting removing method for the purpose of dislodging at least a portion of the degraded mold and core from the casting. It would have

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been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 the use of explosive charge in the energized stream as taught by Vinton et al in order to dislodge at least at selected locations such as the scored lines or grooves so that the dislodged mold parts can be effectively removed from and without damaging the casting.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al and Schlegel et al.

JP 55077972 in view of JP 09182952 and further in view of Vinton et al fails to teach the use of heat treating the casting after the mold and core are removal.

However, Schlegel et al (col. 3, lines 30+) teach the use of heat for treating the casting after the mold and core removal for the purpose of promoting mechanic property such as casting hardness (col. 7, lines 38+). It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 and further in view of Vinton et al the use of heat treating the casting after the mold and core removal as taught by Schlegel et al in order to improve mechanic property such as casting hardness.

9. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al and Pennock et al.

JP 55077972 in view of JP 09182952 and further in view of Vinton et al fails to teach the use of thermally heating the casting.

However, Pennock et al (col. 2, lines 68+) teach the use of thermally heating the casting (coating 25) with heating means including electrical induction heating means (col. 4, lines 73+) for the purpose of promoting uniform casting and differential expansion between the casting and mold and weakening the mold and promoting the removal of casting from the mold. It would

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have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 and further in view of Vinton et al the use of thermally heating the casting as taught by Pennock et al in order to reduce cycling time of removing casting from the sand mold.

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Vinton et al and Andrews.

JP 55077972 in view of JP 09182952 and further in view of Vinton et al fails to teach the use of a degradable binder and sand.

However, Andrews (col. 3, lines 60+) teaches the use of a degradable binder and sand treated with oxidant impregnating liquid for the purpose of promoting collapsibility characteristics of foundry core and mold and weakening the mold after casting and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 and further in view of Vinton et al the use of a degradable binder and sand as taught by Andrew in order to reduce cycling time of removing casting from the sand mold.

11. Claims 23-25, 26-27 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al.

JP 55077972 in view of JP 09182952 fails to teach the use of energy pulsation in the energized stream. However, Heine et al (col. 2, lines 1+) teach the use of energy pulsation in the energized stream such as shock wave through the use of pulse generator 26 for the purpose of dislodging at least a portion of the degraded mold from the casting. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 the use of energy pulsation in the energized stream as taught by Vinton et al in order to dislodge

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at least at selected locations such as the scored lines so that the dislodged mold parts can be effectively removed from and without damaging the casting.

12. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al and Schlegel et al.

JP 55077972 in view of JP 09182952 and further in view of Heine et al fails to teach the use of heat treating the casting after the mold and core are removal.

However, Schlegel et al (col. 3, lines 30+) teach the use of heat for treating the casting after the mold and core removal for the purpose of promoting mechanic property such as casting hardness (col. 7, lines 38+). It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 and further in view of Heine et al the use of heat treating the casting after the mold and core removal as taught by Schlegel et al in order to improve mechanic property such as casting hardness.

13. Claims 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al and Pennock et al.

JP 55077972 in view of JP 09182952 and further in view of Heine et al fails to teach the use of thermally heating the casting.

However, Pennock et al (col. 2, lines 68+) teach the use of thermally heating the casting (coating 25) with heating means including electrical induction heating means (col. 4, lines 73+) for the purpose of promoting uniform casting and differential expansion between the casting and mold and weakening the mold and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP



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09182952 and further in view of Heine et al the use of thermally heating the casting as taught by Pennock et al in order to reduce cycling time of removing casting from the sand mold.

14. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Heine et al and Andrews.

JP 55077972 in view of JP 09182952 and further in view of Heine et al fails to teach the use of a degradable binder and sand.

However, Andrews (col. 3, lines 60+) teaches the use of a degradable binder and sand treated with oxidant impregnating liquid for the purpose of promoting collapsibility characteristics of foundry core and mold and weakening the mold after casting and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide JP 55077972 in view of JP 09182952 and further in view of Heine et al the use of a degradable binder and sand as taught by Andrew in order to reduce cycling time of removing casting from the sand mold.

15. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55077972 in view of JP 09182952 and further in view of Legge et al.

JP '972 in view of JP '952 fails to teach the use of partially solidifying the casting in the mold before directing and dislodging the mold with fluid media.

However, Legge et al (col. 4, lines 44+) teach the use of partially solidifying the casting in a mold for the purpose of generating a thin self supporting metal shell before transferring the mold to have further processing without damaging or deforming the casting shape (col. 6, lines 10+). It would have been obvious to one having ordinary skill in the art to provide JP '972 in view of JP '952 the use of partially solidifying the casting in the mold as taught by Legge et al in

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order to form a thin self supporting metal shell before directing and dislodging the mold with fluid.

16. Claims 44-45 and 48 rejected under 35 U.S.C. 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Legge et al.

Either JP '952, Vinton et al or Heine et al fails to teach the use of partially solidifying the casting in the mold before directing and dislodging the mold with energized stream.

However, Legge et al (col. 4, lines 44+) teach the use of partially solidifying the casting in a mold for the purpose of generating a thin self supporting metal shell before transferring the mold to have further processing without damaging or deforming the casting shape (col. 6, lines 10+). It would have been obvious to one having ordinary skill in the art to provide JP '952, Vinton et al or Heine et al the use of partially solidifying the casting in the mold as taught by Legge et al in order to form a thin self supporting metal shell before directing and dislodging the mold with fluid.

17. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Legge et al and further in view of either Smetan et al or JP 55077972.

Either JP '952, Vinton et al or Heine et al in view of Legge et al fail to teach the use of scoring.

However, Smetan et al (col. 2, lines 66+) teach the use of scoring a portion of the mold including the core for the purpose of weakening the mold and promoting the removal of casting from the mold. JP '972 (see abstract) teaches the use of scoring the mold surface for the purpose of weakening the mold and promoting the removal of casting from the mold. It would

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have been obvious to one having ordinary skill in the art to provide either JP '952, Vinton et al or Heine et al in view of Legge et al the use of scoring as taught by either Smetan et al or JP '972 in order to reduce cycling time of removing casting from the sand mold.

18. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Legge et al and further in view of either Smetan et al or Pennock et al.

Either JP '952, Vinton et al or Heine et al in view of Legge et al fail to teach the use of thermally heating the casting.

However, Smetan et al (col. 2, lines 66+) teach the use of thermally heating the casting a portion of the mold including the core for the purpose of weakening the mold and promoting the removal of casting from the mold Pennock et al (col. 2, lines 68+) teach the use of thermally heating the casting (coating 25) with heating means including electrical induction heating means (col. 4, lines 73+) for the purpose of promoting uniform casting and differential expansion between the casting and mold and weakening the mold and promoting the removal of casting from the mold. It would have been obvious to one having ordinary skill in the art to provide either JP '952, Vinton et al or Heine et al in view of Legge et al the use of thermally heating the casting as taught by either Smetan et al or Pennock et al in order to reduce cycling time of removing casting from the sand mold.

#### ***Response to Arguments***

19. Applicant's arguments with respect to claims 1-43 have been considered but are moot in view of the new ground(s) of rejection. Further, in response to applicant's argument that there is no suggestion to combine the references in claims 44-48, the examiner recognizes that

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obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the step associated with the casting is partially solidified is obvious and taught by Legge et al (col. 4, lines 44+) for the purpose of generating a thin self supporting metal shell before transferring the mold to have further processing without damaging or deforming the casting shape (col. 6, lines 10+).

### ***Conclusion***

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ing-Hour Lin whose telephone number is (571) 272-1180. The examiner can normally be reached on M-F (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IHL

I.-H. Lin

11/03/06

Kevin Kerns  
Primary Examiner  
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